Concerning the objection to the drawings, attached is a proposed amendment to the drawings. Upon its acceptance, a new formal drawing will be filed.

The rejections of claims 5-8 and 22-25 under 35 U.S.C. § 112, second paragraph has been overcome by the amendments to the claims and/or are not deemed tenable. In particular, claims 5, 8, 22 and 25 recite "inert or reducing." Claims 5, 8, 22 and 25 clarify that the recited conductive film refers to conductive film recited in parent claims from which such depend. Claims 6 and 23 have been canceled and replaced by claims 37 and 38, respectively.

Claims 7 and 24 have been amended by deleting "Pd, In, and W." The recitation of mixtures in claims 10 and 27 is not indefinite. Persons skilled in the art aware of the present disclosure would appreciate the scope of these claims.

The rejections of claims 1, 2, 18 and 19 under 35 U.S.C. § 102(b) as being anticipated by Dubin; of claims 1, 9, 10, 18, 26 and 27 as being anticipated under 35 U.S.C. § 102(e) by Maydan; of claims 1, 2, 18 and 19 under 35 U.S.C. § 102(b) as being anticipated by Lee *et al.*, of claims 5, 6, 22 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Dubin and further in view of Zhao *et al*, and of claims 8, 25, 35 and 36 under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Zhao have been rendered moot by the above amendments to the claims.

Claims 2, 4, 20 and 21 have been rejected under 35 U.S.C. § 103 as being unpatentable over Dubin in view of Hong. Claims 7 and 24 have been rejected over Dubin in view of Zhao and in view of Hong. The cited references do not render obvious the present invention. In particular, as appreciated by the Examiner, Dubin fails to suggest a conductive film over the upper surface of the conductor having a thickness of 1 to 20 nanometers. In fact, Dubin seems to suggest a film of 150-200 nanometers thick (see column 6, lines 20-22). Dubin relates to electrolessly depositing a CoWP film. Crucial to the suggestions in Dubin is the CoWP film (e.g., see column 2, line 63 to column 3, line 20).

Hong was relied upon for a disclosure of 9 nanometers. However, Hong is not even properly combinable with Dubin since, among other things, Hong does not relate to CoWP films which are essential according to Dubin. Instead Hong suggests a layer of metallic oxide or

carbide such as Al_2O_3, Cr_2O_3, TiO_2, AlC, TiC or CrC. (see column 5, lines 19-21).

Moreover, Hong does not suggest employing electroless deposition for forming such a layer as required by Dubin. Also see claims 2, 4, 5, 6, 7, 8, 19, 21, 22, 24, 25, 35 and 36 of the present application. Critical to the suggestions of Hong is the use of specific chemical vapor deposition techniques. In fact at column 1, lines 29-36, Hong discusses problems of depositing their film, which are to be addressed by the particular techniques suggested therein. Accordingly, use of electroless deposition would be contrary to the suggestions in Hong.

Zhao fails to overcome the above discussed deficiencies of Dubin and Hong with respect to rendering obvious the present invention. In particular, Zhao was merely relied upon for a disclosure of annealing. However, Zhao is not even properly combinable with Dubin since, among other things, Zhao does not suggest CoWP film required by Dubin. The capping layers suggested by Zhao are 500-1500 angstroms (i.e. -50-150 nanometers) (see column 8, lines 18-31) and include Ni-Co, CoP, NiCoP or NiP (see column 8, lines 12-15).

The cited references are even more remote with respect to claims 10, 27, 35 and 36 with respect to the recited conductive films.

The mere fact that cited art may be modified in the manner suggested by the Examiner does not make this modification obvious, unless the cited art suggest the desirability of the modification. No such suggestion appears in the cited art in this matter. The Examiner's attention is kindly directed to *In re Lee* 61 USPQ2d 1430 (Fed. Cir. 2002) *In re Dembiczak et al.* 50 USPQ2d. 1614 (Fed. Cir. 1999), *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984), *In re Laskowski*, 10 USPQ2d. 1397 (Fed. Cir. 1989) and *In re Fritch*, 23 USPQ2d. 1780 (Fed. Cir. 1992).

In Dembiczak et al., supra, the Court at 1617 stated: "Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., C.R. Bard, Inc., v. M3 Sys., Inc., 157 F.3d. 1340, 1352, 48 USPQ2d. 1225, 1232 (Fed. Cir. 1998) (describing 'teaching or suggestion motivation [to

combine]' as in 'essential evidentiary component of an obviousness holding'), In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d. 1453, 1459 (Fed. Cir. 1998) ('the Board must identify

specifically...the reasons one of ordinary skill in the art would have been motivated to select the references and combine them');...".

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **<u>"Version with markings to show changes made."</u>**

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

By

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Version With Markings to Show Changes Made

1. (Amended) A method for forming conductors with high electromigration resistance comprising [the steps of]

forming a layer of dielectric on a substrate,

forming at least one trench in said layer of dielectric,

forming a metal liner in said trench,

forming a conductor on said metal liner filling said trench,

forming a planarized upper surface of said conductor planar with the upper surface of said layer of dielectric, and

forming a conductive film over said upper surface of said conductor, said conductive film forming a metal to metal metallurgical bond

<u>and wherein said conductive film has a thickness of 1 to 20 nanometers</u>.

3. (Amended) The method of claim [2] <u>1</u> wherein said [electroless deposited] <u>conductive</u> film has a thickness in the range of 1 to [20] <u>10</u> nanometers.

5. (Amended) The method of claim 2 wherein said [step of] electroless deposition includes [the steps of] first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on said upper surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby <u>said conductive film formed comprises</u> a metal-phosphide conductive film [is formed] on said upper surface of said conductor, and

annealing said substrate in one of an inert [and] <u>or</u> reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film.

7. (Amended) The method of claim 5 wherein said conductive film is selected from the group consisting of CoWP, CoSnP, <u>and</u> CoP[, Pd, In and W and is in the range from 1 to 20 nm thick].

8. (Amended) The method of claim 2 wherein said [step of] electroless deposition includes [the steps of]first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on the surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and dimethylamino borane whereby said conductive film formed comprises a layer of metal-boron conductive film [is formed] on said upper surface of said conductor and,

annealing said substrate in one of an inert [and] or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal boron conductive film.

18. (Amended) A method for forming conductors with high electromigration resistance comprising [the steps of]:

forming a patterned conductor on a substrate,

forming a conductive film over said surface of said conductor, said conductive film forming a metal to metal metallurgical bond and has a thickness of 1 to 20 nanometers.

20. (Amended) The method of claim [19] 18 wherein said [electroless deposited] conductive film has a thickness in the range of 1 to [20] 10 nanometers.

22. (Amended) The method of claim 19 wherein said [step of]electroless deposition includes [the steps of] first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on said surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and hypophosphite ions whereby said conductive film formed comprises a metal-phosphide conductive film [is formed] on said surface of said conductor, and

annealing said substrate in one of an inert [and] or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal phosphide conductive film

24. (Amended) The method of claim 22 wherein said conductive film is selected from the group consisting of CoWP, CoSnP, and CoP[, Pd, In and W and is in the range from 1 to 20 nm thick].

25. (Amended) The method of claim 19 wherein said [step of]electroless deposition includes [the steps of]first immersing said substrate in a solution of metal ions whereby a layer of nanoparticles of metal are formed on the surface of said conductor,

second immersing said substrate in an electroless complexed solution of metal ions and dimethylamino borane whereby said conductive film formed comprises a layer of metal-boron conductive film [is formed] on said surface on said conductor, and

annealing said substrate in one of an inert [and] or reducing atmosphere at a temperature of at least 300° C for at least 2 hours whereby excellent adhesion is obtained between said conductor and said metal boron conductive film.